

## REMARKS

### Amendments to the claims

Claim 1 has been amended to recite *"a plurality of optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region, wherein the second end of the fibers are detached from each other"*.

Claim 11 has been amended to recite *"fusing the optical fibers together along a section of each optical fiber proximate the first end to form a fused section, so that the second end of the fibers remain detached from each other"*.

The amendments of claims 1 and 11 are supported by the application as filed, in particular Fig. 1 and the corresponding portion of the specification.

New claim 27 has been added. Claim 27 recites the features of original claim 1, and additionally recites that the optic fibers are silica optic fibers. New claim 27 is supported by the application as filed, in particular paragraph [0036] of the specification.

New claim 28 has been added. Claim 28 recites the features of claim 9, taken in its dependency on original claim 1. The term "uniformly stretched" has been replaced by the term "stretched". The application as filed supports this amendment, for example paragraph [0037].

No new matter has been added. Applicants submit that all the amendment to the claims are done without prejudice, and expressly reserve the right to prosecute the original claim features in this application or in any derivative thereof.

### Rejection under 35 U.S.C. 102

Claims 1, 4, 9-11, 18 and 19 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,303,373 to Harootian. Applicants respectfully disagree.

Claim 1

Harootian discloses an anamorphic, tapered fused fiber optic bundle comprised of optic fibers, wherein the fiber optics are fused together at the two ends of the bundle, as shown in Fig. 2 of Harootian. Accordingly, Harootian cannot be deemed to disclose or suggest a fiber optic apparatus as recited in amended claim 1, and in particular comprising *"a plurality of optical fibers, each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber to form a fused section having a fiber axis, the fused section of the plurality of optical fibers being tapered to form a tapered region, wherein the second end of the fibers are detached from each other"*. Accordingly, Applicants submit that claim 1 is patentable over Harootian.

Claim 11

The above argument can be used to show that Harootian does not disclose or suggest a method as recited in claim 11, and in particular comprising *"fusing the optical fibers together along a section of each optical fiber proximate the first end to form a fused section, so that the second end of the fibers remain detached from each other"*. Accordingly, Applicants submit that claim 11 is patentable over Harootian.

Claims 4, 9-10, 18 and 19

Claims 4 and 9-10 depend on claim 1, and claims 18, 19 depend on claim 11. Applicants submit that claims 4, 9-10, 18 and 19 are patentable over Harootian at least in view of their dependency on claims 1 or 11.

Rejection under 35 U.S.C. 103

Claims 5, 6, 8, 14, 15, 17, 20, 23, 25 and 26 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Harootian; claims 2, 13 and 21 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Harootian in view of U.S. Pat. No. 6,827,500 to Basavanhally; claims 3, 12 and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Harootian in view of U.S. Pat. No. 5,045,100 to Smith; and claims 7,

view of Smith and further in view of U.S. Pat. No. 6,411,762 to Anthon. Applicants respectfully disagree.

Claims 5-6, 8, 14-15 and 17

Claims 5-6 and 8 depend directly or indirectly on claim 1 and claims 14-15 and 17 depend directly or indirectly on claim 11. Applicants submit that at least in view of their dependency on claims 1 or 11, claims 5-6, 8, 14-15 and 17 are patentable over Harootian.

Claim 20

The Examiner asserts that Harootian shows a device "wherein the diameter of the optical input at the fused end of the given optical fiber is smaller than the diameter of the same optical input at the unfused end of the given optical fiber (col. 3, lines 34-43; col. 2, lines 22-26)". Applicants concur with the analysis the Examiner makes of Harootian, and note that claim 20 recites an apparatus comprising a plurality of optical fibers, "*each optical fiber having a first end and a second end, said plurality of fibers being fused together along a section of each optical fiber proximate the first end of each optical fiber*" and "*wherein the diameter of the optical input at the first end of a given optical fiber (the fused end) is larger than the diameter of the same optical input at the second end of the given optical fiber (the unfused end)*". Accordingly, Applicants submit that the Examiner acknowledges that claim 20 is not anticipated by Harootian, and submit that claim 20 is patentable over Harootian.

Claims 23, 25 and 26

Claims 23, 25 and 26 depend on claim 20. Applicants submit that at least in view of their dependency on claim 20, claims 23, 25 and 26 are patentable over Harootian.

Claims 2, 13 and 21

The Examiner acknowledges that Harootian does not disclose all of the features of claims 2, 13 and 26, but asserts that it would have been obvious for one of ordinary skill in the art to combine the teachings of Harootian and Basavanhally. Applicants respectfully disagree with this assertion.

Harootian discloses (column 2, lines 22-26) "an anamorphic fused fiber optic bundle which is tapered from the cross-sectional geometry at one end to a different cross-sectional geometry at the other end and which is useful to couple imaging devices" wherein the optic fibers of the bundle are fused together at the two ends of the bundle and wherein it is essential that the centers of the fibers at each end of the bundle be kept as close as possible to increase the resolution of the coupling.

Basavanhally discloses a precision two dimensional optical fiber array wherein a first end of each fiber is inserted in a ferule and wherein the ferules are fixed together according to a precise predetermined pattern. Basavanhally further teaches that the predetermined pattern cannot be achieved without using the ferules (column 1, lines 41-47).

Applicants submit that the Examiner has failed to show what would have been the motivation of one of ordinary skill in the art to combine the teachings of Basavanhally, which provides a large distance between the centers of the fiber ends (due to the ferules), with the fused fiber optic bundle of Harootian, wherein a reduced distance between the centers of the fiber ends is a critical feature. Applicants further submit that the Examiner has failed to show how one of ordinary skill in the art would have combined the ferules around the fiber ends of Basavanhally with the optical fibers ends fused together of Harootian.

Accordingly, Applicants submit that the Examiner has failed to show that one of ordinary skill in the art would have combined Harootian and Basavanhally to obtain the features recited in claims 2, 13 or 21, and submit that claims 2, 13 and 21 are patentable over Harootian in view of Basavanhally.

#### Claims 3, 12 and 22

The Examiner acknowledges that Harootian does not disclose all of the features of claims 3, 12 and 22, but asserts that it would have been obvious for one of ordinary skill in the art to combine the teachings of Harootian and Smith. Applicants respectfully disagree with this assertion.

It has been seen above that Harootian discloses an anamorphic fused fiber optic bundle, wherein it is essential that the centers of the fibers at each end of the bundle be kept as close as possible to increase the resolution of the coupling.

Smith discloses a fiber optic terminal assembly wherein the fibers are not fused together, and wherein the fibers are bonded by a glass matrix (melt glass allowed to flow between the fibers, col. 1, lines 45-51), thus leaving a substantial distance between the centers of the bonded end of the fibers.

Applicants submit that the Examiner has failed to show what would have been the motivation of one of ordinary skill in the art to combine the teachings of Smith, which teaches bonding the fibers using a glass matrix and thus teaches leaving a substantial distance between the centers of the bonded end of the fibers, with the fused fiber optic bundle of Harootian, wherein a reduced distance between the centers of the fiber ends is a critical feature.

Applicants further submit that the Examiner has failed to show how one of ordinary skill in the art would have combined the glass matrix of Smith with the optical fibers fused together of Harootian, since there is no interstice left between the fibers fused together of Harootian (see Fig. 2) to introduce the glass of the glass matrix of Smith.

Accordingly, Applicants submit that the Examiner has failed to show that one of ordinary skill in the art would have combined Harootian and Smith to obtain the features recited in claims 3, 12 or 22, and submit that claims 3, 12 and 22 are patentable over Harootian in view of Smith.

#### Claims 7, 16 and 24

The Examiner acknowledges that Harootian does not disclose all of the features of claims 7, 16 and 24, but asserts that it would have been obvious for one of ordinary skill in the art to combine the teachings of Harootian, Smith and Anthon. Applicants respectfully disagree with this assertion.

It has been seen above that Harootian discloses an anamorphic fused fiber optic bundle wherein it is essential that the centers of the fibers at each end of the bundle be kept as close as possible to increase the resolution of the coupling, that Smith discloses a

fiber optic terminal assembly wherein the fibers are bonded by a glass matrix, thus leaving a substantial distance between the centers of the bonded end of the fibers, and that the Examiner has failed to show why or how one of ordinary skill in the art would have combined Harootian and Smith.

Anthon discloses the use of a fluorosilicate glass matrix in the formation of optical fiber bundles. Applicants submit that, as for Smith above, the Examiner has failed to show what would have been the motivation of one of ordinary skill in the art to combine the teachings of Anthon, which teaches bonding the fibers using a glass (fluorosilicate glass) matrix and thus teaches leaving a substantial distance between the centers of the bonded end of the fibers, with the fused fiber optic bundle of Harootian, wherein a reduced distance between the centers of the fiber ends is a critical feature.

Applicants further submit that, as for Smith above, the Examiner has failed to show how one of ordinary skill in the art would have combined the fluorosilicate glass matrix of Anthon with the optical fibers fused together of Harootian, since there is no interstice left between the fibers fused together of Harootian to introduce the glass of a glass matrix.

Accordingly, Applicants submit that the Examiner has failed to show that one of ordinary skill in the art would have combined Harootian and Smith or Anthon to obtain the features recited in claims 7, 16 or 24, and submit that claims 7, 16 and 24 are patentable over Harootian in view of Smith and further in view of Anthon.

#### New claims

##### Claim 27

Harootian discloses an anamorphic, tapered fused fiber optic bundle comprised of glass optic fibers (col. 5, lines 9-13). Accordingly, Harootian cannot be deemed to disclose or suggest a fiber optic apparatus as recited in amended claim 27, and in particular comprising "*a plurality of silica optical fibers*". Accordingly, Applicants submit that claim 27 is patentable over Harootian.

Claim 28

Claim 28 recites the features of original claim 9 taken in its dependency of claim 1. In the Action, the Examiner rejects claim 9 by arguing that "it is inherent that different amounts of stretch result in different degrees of coupling between fibers". Applicants respectfully disagree, and note that the Examiner seems to rely on knowledge that is not available to Applicants to make the above assertion. Applicants respectfully request that the Examiner provide an Affidavit pursuant to 37 C.F.R. § 1.104(d)(2) in support of the assertion that "it is inherent that different amounts of stretch result in different degrees of coupling between fibers". Applicants further note that if coupling existed between the fibers of Harootian, the resulting crosstalk would blur the pixels of the images coupled, and reduce the quality of the coupling.

Further, Applicants note that Harootian recites (column 3, lines 8-11) that "all pixels (individual optical fibers; resolution) along a given axis are compressed at the smaller end of the taper such that the pixels fit essentially precisely from one side of the corresponding imaging device to the other side across such axis". Accordingly, even if the Examiner were right in asserting that "it is inherent that different amounts of stretch result in different degrees of coupling between fibers", Harootian explicitly recites that the compression of the fibers is directed towards achieving desired physical dimensions, and not achieving a desired amount of optical coupling. Applicants submit that compressing the fibers to achieve desired physical dimensions is not compatible with, and therefore teaches away from, compressing (or stretching) the fibers to achieve a desired coupling, since the desired physical dimensions would correspond to a given optical coupling (if there is actually an inherent coupling), not a desired optical coupling.

In view of the above, Applicants submit that Harootian does not teach or suggest a fiber optic apparatus as recited in claim 28, and in particular "*wherein the plurality of optical fibers disposed in the fused section are stretched to provide a desired amount of optical coupling between each optical fiber*". Accordingly, Applicants submit that claim 28 is patentable over Harootian.

In view of the above, Applicants submit that the application is now in condition for allowance and respectfully urge the Examiner to pass this case to issue.

The Commissioner is authorized to charge any additional fees that may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136(a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

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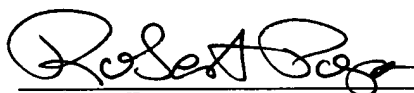
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Respectfully submitted,



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